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Research Paper

Visitor users vs. non-users of public transport: The case of Munich, Germany

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ABSTRACT

Although its importance for sustainable tourism is recognised little research has been conducted on tourist use of public transport. This paper examines the use of public transport by visitors in the city of Munich, Germany. Its objectives are twofold. First, it investigates the motivations for using or not using public transport. It focuses on distinctive characteristics between the users and non-users and how they are different in their demographic and travel profiles as well as their attitude towards public transport. Second, it seeks to understand which factors influence visitor use of public transport. The main reasons for visitor use of public transport are drive-free benefits, traffic reduction, advantages of local public transport, and car unavailability. In contrast, what often discourages public transport use are inconvenience and restrictions, lack of information, disadvantages of public transport and personal preferences. The five most important variables that differentiate visitor user of public transport from a non-user are length of stay, main purpose of trip, age group, frequency of public transport use at place of residence, and valid driving license ownership.

The study highlights the importance of public transport information and accessible and conveniently located train stations and bus stops for visitors and locals alike. A significant finding is the extent to which public transport needs to be promoted as part of strategic destination marketing. The use of social marketing techniques to influence behavioural change with respect to public transport use is therefore desirable in the pre-trip decision stage as well as at the destination.

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1. Introduction

Tourism is essentially the voluntary short-term movement of people through time and space, either between home places and destinations or within destinations (Coles, Duval, & Hall, 2004; McKercher & Lew, 2004). The movement patterns of visitors are the results of a complex interaction between several factors such as human factors, physical factors, trip factors, and time factors (Lau & McKercher, 2006). Furthermore, the transport modes selected by tourists during their stay at the destination influence their movement patterns with the extent of the area visited linked to the transport mode choices (Masiero & Zoltan, 2012; Koo, Wu, & Dwyer, 2010).

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Among various modes of land transport, the car is most often used for travel and leisure purposes in developed countries (Duval, 2007; Hall, 2010). However, growing populations and increasing demand for leisure and tourism have led to more congestion, pollution, and traffic problems in many cities worldwide. The need for sustainable urban transport practices including with respect to tourism has therefore become increasingly urgent (Guiver, Lumsdon, Weston, & Ferguson, 2007; Regnerus, Beunen, & Jaarsma, 2007). Due to its multiple environmental, social and economic benefits (Gwilliam, 2008; Litman, 2007, 2011), public transport (PT) (otherwise referred to as mass transit, public transit, and public transportation) is promoted as a potential car replacement. Yet encouraging a modal shift is not an easy task (Dickinson, Robbins, & Fletcher, 2009; Gössling, 2011; Hall, 2014; Lumsdon, Downward, & Rhoden, 2006; Redman, Friman, Gärling, & Hartig, 2013). To promote PT use, whether to visitors or to local users, it is critical to have an effective and efficient PT system. In particular, PT services should be demand-oriented and a good knowledge of customer behaviour is thus of great importance (Gronau & Kagermeier, 2007). However, to date most research on PT is focused on local users rather than the PT needs of visitors.

Public transport is also considered as an additional tourism product, which adds to the total tourist experience (Duval, 2007) and may influence tourist satisfaction with the destination (Thompson & Schofield, 2007). It is important therefore to identify PT users for management and marketing purposes. Nevertheless, there is a substantial lack of information on the tourist users of PT (Lumsdon et al., 2006). In addition, while non-users of PT could be potential users (Dallen, 2007a; Krizek & El-Geneidy, 2007), not much is known about this group and how they are different from the users in terms of personal characteristics and attitudes towards PT.

This paper contributes to filling the gap in the literature by examining how visitors use PT in the city of Munich, a major tourism gateway and destination in Germany (German National Tourist Board, 2012). Public transport mentioned in this study refers primarily to rail (train, tram, subway) and buses. It seeks to understand the tourist reasons for using and not using PT at a destination as well as the most important factors determining the PT usage. The paper concludes with implications for future research as well as recommendations for PT management and operators.

2. Tourists' use of public transport

2.1. Characteristics of the tourist users of PT

The tourist users of PT are a group distinct from resident users. Newcomers to the city of Dublin, for example, were more concerned with the provision of information and reliability of service and placed less emphasis on traditional aspects of PT such as service quality and safety (Kinsella & Caulfield, 2011). Dubliners, on the other hand, considered punctuality, frequency and waiting times as most important. In addition, tourists differ from local users in their information search behaviour as they require more information and use different sources (Thompson, 2004). Information centres, word-of-mouth, attraction leaflets, Internet and accommodation providers are common information sources for tourists.

Tourist users of PT may also have diverse backgrounds and differ between rural and urban areas. In urban areas, users of PT for tourism purposes tend to be well-educated and the majority hold a driving license (Farag & Lyons, 2012). This group of users are generally of a younger age (Farag & Lyons, 2012; Quiroga, 1990; Thompson & Schofield, 2007). A study of PT use by tourists in Manchester, for instance, had 73% of the respondents under 35 years old (Thompson & Schofield, 2007). However, a different situation is found in rural areas. Lumsdon et al. (2006) indicated that the majority users of the Wayfarer, a multi-modal ticket for day excursions to the countryside in the United Kingdom, were aged 55–64 and retired.

2.2. Categories of visitor PT users

Public transport users in rural areas are not homogenous. Lumsdon (2006) found two groups of tourist bus users: the “sightseer” and the “activity seeker”. The “sightseer” forms the largest user segment of the tourism bus network in the UK, whose main purpose of using the bus is for a scenic ride. Nevertheless, “avoiding parking fees”, “driving in unfamiliar places”, and “social contact with others” were also reasons. Most sightseers were around 40 years old plus, travel solo or as couple, but there were also a sub-segment of older women who looked for social contact and a sub-segment of young backpackers travelling without a car. The second, “activity seeker group”, include mostly older people tended to use the bus to do leisure activity such as walking, cycling and surfing.

Dallen (2007a) categorised visitors to St Ives (UK) into two segments based on whether they used the train services. Visitor users of the train were then grouped into “road regulars”, “public transport

reliants”, and “train enjoyers”. “Road regulars” tended to be family groups who are regular car users, using PT to travel mostly to avoid road congestion and because of recommendations. “Public transport reliants” are those often in younger age group (16–34), less likely to possess a driving license and a car. This group includes mostly regular PT users and international visitors. The “train enjoyers” by contrast, are older in terms of age (45–54 range) and chose to travel by PT to enjoy a scenic and relaxed train ride. Non-users were classified by Dallen (2007a) as “anti-rail riders”, “content car drivers” and the “train tempted”. “Anti-rail riders” are those of higher socio-economic occupational background who have strong preference for a car for independence and convenience. The “content car drivers” are familiar with train travel but are indifferent about whether it is an enjoyable mode. The last group, the “train tempted” is believed to have the greatest potential to switch to an alternative PT mode. This group consists of mostly visitors over 55 years old, retired and likely to be male.

Similarly, visitor users of the train in The Looe Valley (UK) were identified as consisting of the “train devotees”, “infrequent enthusiasts”, “train tolerators”, “consented car users” and “last resort riders” (Dallen, 2007b). Despite having the same behaviour (i.e. taking the trains to the attraction), visitors demonstrated a complex set of attitudes, perceptions, and activities, which complemented Anable's (2005) study on resident PT users. For instance, the “train devotees” tend to have strong preferences for using the train although they could afford a car. The “train tolerators”, do not show much desire for the train but are unable to drive cars.

Lumsdon (2006) and Dallen (2007a, 2007b) have provided valuable information on the complex profiles of PT visitor users in rural areas. However, little is known about the typologies of PT visitor users in a metropolitan area. Anable (2005) clustered the resident PT users near Manchester into “malcontented motorists”, “complacent car addicts”, “die hard drivers”, “aspiring environmentalists”, “car-less crusaders”, and “reluctant riders”. These groups of PT users are distinctive from each other in terms of preferences, worldviews and attitudes, and hence should be addressed differently. This also suggests that there are potentially different motivations behind the same behaviour and that knowledge of motivations for PT use is critical to understanding visitor use of PT.

Barr and Prillwitz (2012) found four groups of urban PT travellers in South West England, namely (1) “addicted car users”, (2) “aspiring green travellers”, (3) “reluctant public transport users” and (4) “committed green travellers”. Aspiring and committed green travellers are those who have pro-environmental attitudes and would consider and use alternative modes whenever possible. The former group comprises younger middle-aged in higher scale occupational level people whereas the latter includes mostly middle-aged people who have managerial or professional occupational background. The “reluctant public transport users” are often older and retired people who have restricted accessibility to the car.

These studies provide some insights into the profile of PT users in urban areas and tourist users of PT in rural areas. However, the visitor users and non-users of PT in cities (especially outside the UK) remain little known. Hence, there is a need to understand urban visitor attitudes towards PT and what motivates them to use or not to use PT. Transport policies and marketing strategies can consequently be planned so as to attract more PT non-users to become choice users. For transport operators, this would increase ridership and revenues. A good destination image could be a result for having an effective and efficient PT system such as in the case of Singapore and San Francisco (Mandeno, 2011). Furthermore, in the case of visitors travelling with a car, successfully encouraging a modal shift would contribute to reduce traffic congestion and pollution in the city. To attract more visitors to use PT, it is necessary to understand their motivational background.

3. Visitor motivation for public transport use

Tourist motivation is a hybrid concept, 'which is borrowed from the individual orientation of psychology' and 'applied to a specific domain of human action' (Pearce, 1993, p. 113). Though motivation is only one of a number of variables such as demographic characteristics, knowledge, experience, and cultural influences that are used to explain consumer behaviour, it is a vital factor as it is 'the driving force behind all behaviour' (Fodness, 1994, p. 555). Motivations in tourism are often classified as push or pull factors, where "push" refers to the tourists' objective reasons and "pull" is the attractiveness of the object (destinations or sites) (Dann, 1977).

In studies on PT, user needs of information, accessibility, security, and reliability have been extensively researched (Brons, Givoni, & Rietveld, 2009; Friman, Edvardsson, & Gärling, 2001; Friman & Gärling, 2001; Redman et al., 2013). However, the motivation and the socio-psychological benefits associated with this form of transport experience are little examined (Lumsdon et al., 2006). People may use or not use PT for many reasons, which vary from place to place and case to case. In the case of tourists specifically, according to Guiver et al. (2007), a desire for a walk and environmental concerns was the reasons for using the bus in rural areas.

Environmental concern was also believed to be one driving force for tourists to take the bus in another UK study (Lumsdon et al., 2006). Lumsdon asserted that tourists used the bus for reasons such as avoiding parking fees and driving in unfamiliar places, reducing the number of car use, and looking for social contact and for a scenic ride.

Stradling, Carreno, Rye, and Noble (2007) confirmed the importance of social and interpersonal interaction opportunity in motivating bus use. Age and frequency of bus use appeared to have more influence on the motivational factors as compared to annual household income, car availability and gender. On the other hand, it was revealed in the same study of passenger perception of the bus journey experience in Edinburgh that the main reasons that discouraged people from using buses are feeling unsafe, preference for walking or cycling, problems with service provision, unwanted arousal, preference for car, cost, disability and discomfort, and self-image.

A study of tourists to St Ives in the UK indicated that tourists who used rail to reach the destination were driven by congestion avoidance, recommendations from friends or family, enjoyment and relaxation of the train, as well as environmental contribution (Dallen, 2007a). In contrast, some of the reasons for visitors' non-use of train could be due to a lack of awareness of a train service, unsuitable train connection or simply because of preferences. However, the study focused on a specific transport mode (i.e. rail) to a resort destination (St Ives) rather than transport within a destination.

The motivations for PT use identified are mostly push factors. Tourists look for alternative modes due to reasons such as difficulties in driving, avoiding parking cost and reducing congestion. The pull factor (i.e. the attractiveness of PT) has not yet been examined. Would an excellent PT system motivate tourists to use PT? As Lumsdon (2006) suggested, while transport to and from destinations is a well-researched topic, transport at destinations has received little attention. In addition, most studies on PT in tourism have focused on rural areas. There is therefore a need for research of visitors' use of PT in an urban context. A study investigating how visitors use PT in the city of Munich, Germany is thus of important contribution to this field.

4. Munich's public transport system

Munich is a commercial, industrial and cultural centre of southern Germany and is the capital of the wealthy state of

Bavaria. The city is the second most visited in the country (after Berlin) with 5.4 million overnight stays in 2011 (German National Tourist Board, 2012). The city has put substantial emphasis on sustainable development with sustainable mobility an important part of its transport policy (City of Munich, 2005a, 2005b).

Munich has a long history of urban-planning and transport management starting from the early 20th century. Several sustainable transport projects and development plans have been undertaken in Munich. Examples include the long term plan *Perspective Munich*, which aims at better urban expansion management (City of Munich, 2005a, 2005b), and the mobility management concept "*München – Gscheid mobil*" (Munich – Efficiently Mobile), which targets increased (sustainable) mobility for four groups: new citizens, children and young people, companies, and other important target groups including the elderly (Schreiner, 2007). However, despite efforts to develop sustainable mobility in the metropolitan region of Munich, tourists have so far received only little attention as PT users.

Visitors to Munich are attracted by its distinctive culture and history. The city offers several remarkable arts museums, historical sites, and festivals attracting millions of tourist arrivals every year, especially during Oktoberfest. While the city centre is relatively small, the presence of various interesting sites spread around the city such as palaces, botanical gardens and a zoo make it necessary for visitors to use a transport mode other than walking. Within the city most tourist sites could be easily reached by PT. Nonetheless, to encourage visitors to choose and use PT, the system needs to be effective and attractive.

Since the first tramway in 1876 and the operation of the underground train in 1971, Munich has one of the most well-developed and extensive traffic and PT networks in Europe. There are 442 km of S-Bahn (suburban trains), 95 km of U-Bahn (underground trains), 79 km tram and 454 km of local bus route. The systems are operated by different organisations under the supervision of the Munich Transport and Tariff Association (MVV – Münchner Verkehrs- und Tarifverbund). In 2011, 522 million passengers were transported by PT in Munich. Sixty-six percent of the residents of Munich use the underground, bus and tram several times per week and 35% of them are daily user of the systems (Münchner Verkehrsgesellschaft, 2010).

Since 2007 visitors to Munich have been offered a "CityTourCard" which combines unlimited travel on PT and discounts at several attractions. The Card can be purchased for one or three days, and for single or group (up to five people) use. However, the Card is not as popular as it potentially could be due to the relatively limited number of participating partners and the minor financial benefits of purchase (mostly only one or two euros less than normal prices). Munich has tremendous appeal to tourists yet the provision of excellent public transport services is necessary to support the growing number of tourists while simultaneously contributing to environmental goals (Münchner Verkehrsgesellschaft, 2010). An important component of this is a greater understanding of tourist motivation for PT use in Munich.

5. Method

To examine tourist use of PT in Munich data were collected from a visitor survey. Questionnaire-based surveys are a standard method to research customer behaviour (see, for example, Bansal & Eiselt, 2004; Felleson & Friman, 2008) and have been adopted in this study. Self-administered surveys were the most efficient and effective use of the resources available.

5.1. Data collection

In order to generate the largest number possible of respondents, the survey was carried out at the most popular tourist sites

in Munich. However, to increase accessibility to tourists, three main study sites were chosen: the English Garden, the Residenz (Royal Residence), and the Pinakothek Museum (Art Gallery). These are sites that are both popular to tourists and convenient for approaching them. The survey assistants (three in total) divided their time between these sites.

Respondents were recruited using a random intercept approach. The survey assistant approached the tourists near the entrance of the attraction, introducing herself and briefly outlining the research project, and inviting the tourists to participate in the survey. Questionnaires (in English, German and Italian) were handed out to those who had agreed to participate and were filled in and returned on site.

Following pilot testing, the survey was conducted in April and May 2012. Overall, 2481 people were approached and about 500 questionnaires distributed. Of the 483 questionnaires collected, 466 were usable, 17 were rejected because the questionnaire was not properly completed, because either most of the important questions were skipped or the respondents were not considered as visitors. As defined by [World Tourism Organisation UNWTO \(2013\)](#), visitors refer to those who were in Munich for less than a year for non-work purposes. Though tourists are those particular visitors who stayed overnight at a destination, in this study, these two terms are used interchangeably.

5.2. Data analysis

Respondents were divided into two groups: users and non-users based on their answers to the question “Have you used public transport in Munich during this visit?” Users and non-users of PT were then routed to separate sections to rate their motivations for using or not using PT on a Likert scale from one to five, with one being not at all relevant and five being totally relevant. The motivational statements for PT use (20 items) and non-use (15 items) were developed with reference to related studies discussed earlier, inputs from respondents in the pilot tests as well as exploratory items. Questions on trip and demographic characteristics were answered by all respondents. Comparison between the two groups was checked for statistical significance using Chi Squared test (for nominal variables) and Mann–Whitney *U* test (for ordinal data).

Motivational dimensions for PT use were identified using factor analysis with Varimax orthogonal rotation method. Factors were extracted using the following criteria: an eigenvalue greater than 1 and factor loadings greater than 0.5. A reliability analysis (Cronbach's alpha) was used to assess the correlation between variables of each identified factor. All factors with an α reliability above 0.50 were accepted for the purpose of this study. Discriminant Function Analysis (stepwise method) was run to identify the most influential factors determining a visitor user of PT in Munich.

6. Visitor user vs. non-user of public transport

The survey included 466 respondents, of which the majority (82%) used PT during their visit in Munich (380 visitors) and 18% were non-users of PT (86 visitors). This section reports on the distinctions in demographic and trip related characteristics between the two groups of respondents in the sample: the user vs. non-user of PT.

6.1. The PT user

Slightly over half of the PT users are male (51%). Younger people dominate the sample with 40% in the age of 18–29 years old. Most users are well-educated (48% are university or college graduates and 14% are post-graduates). Germans account for 21%

of the user group and all other European visitors represent 51%. A large majority of the users indicated no health restriction (87%).

Almost half of the users (48%) have previously been to Munich. A stay of 2–3 days is most common (41%), followed by a stay of 4–6 days (32%). Most users travelled with their friends (31%), partner (23%), and family or relatives (22%). The majority of the users visited Munich on holiday (54%) or for VFR purposes (22%).

Thirty nine percent of user group rarely or never used PT at place of residence, whereas 36% are frequent users. Most visitors in this group (93%) possess a valid driving license and 77% indicated ownership of a car.

6.2. The PT non-user

Above half of the non-user group (57%) are female. The majority of respondents are in medium age group (three age groups 30–39, 40–54, and 55–64, each shares around 20% the sample). Most respondents are well-educated. German visitors represent 32% of the group and other European visitors account for 54%. Only a minority of the group stated some types of health restriction (12%).

Most non-users (65%) were returning visitors to Munich. Respondents in this group tended to have a short stay in Munich, with 49% staying for 2–3 days and 36% for only one day. One-fifth of the group (20%) travelled alone whereas the remainder was accompanied by friends, partner, family or relatives. Their purposes of visit are also diverse: holiday (37%), VFR (27%), business (18%), and education (11%).

Almost half of the group rarely or never used PT in their home area as compared to 15% who used PT almost every day. Most of the group (86%) had a valid driving license and three quarters own a car (75%).

6.3. User vs. non-user

A comparison between the user and non-user group shows some interesting differences. Chi Square tests show statistical significant difference (at $p < 0.05$) between two groups in terms of driving license ownership, whereas Mann–Whitney *U* tests indicate differences regarding age structure and the habit of using PT at home residence ([Table 1](#)).

- Age ($p=0.000$): The user group is dominated by younger population, yet a different structure is shown in the non-user group where the 55–64 age group is the largest. Respondents of 65 years old and above in the non-user group also accounts for a higher proportion (13% compared to 6%).
- Use of PT at home ($p=0.006$): Almost half of the non-user group rarely or never use PT at place of residence (47%) while this number for the user group is 39%.
- Driving license ($p=0.048$): 14% of the non-user group do not have a driving license while this number for the user group is only 8%.

No or minor differences exist between the two groups in terms of gender, educational level, country of residences, and health restrictions. However, the PT users and non-users differ significantly in their trip related characteristics ([Table 2](#)).

- First-time visitor ($p=0.028$): The proportion of returning visitors to Munich in the non-user group is higher than the user group (65% compared to 52%).
- Trip duration ($p=0.000$): While only 10% of the users were in Munich for a day visit, the proportion for the non-users was 36%. The short duration of stay may help explain why tourists only visiting a few central attractions did not (have to) use PT.

Table 1
Respondents' demographic profiles: PT users vs. non-users.

Variable	User (%) (n=380)	Non-user (%) (n=86)	Total (%) (n=466)	Sig. level (χ^2 test)	Sig. level (U test)
Gender				0.253	
Male	50.4	43.5	49.0		
Female	49.6	56.5	51.0		
Age					0.000
< 18	2.7	4.7	3.0		
18–29	39.7	16.5	35.4		
30–39	17.6	21.2	18.2		
40–54	17.6	21.2	18.2		
55–64	16.3	23.5	17.6		
65+	6.1	12.9	7.6		
Educational level					0.671
Secondary school	8.8	16.5	10.2		
High school	19.8	12.9	18.5		
Vocational school	7.2	11.8	9.0		
College and University	47.9	38.8	46.3		
Post graduate	14.4	16.5	14.8		
Other	1.9	3.5	2.2		
Country of residence				0.066	
Germany	21.1	31.8	23.0		
Other	51.2	54.1	51.6		
European countries					
The US and Canada	12.5	4.7	11.2		
Other parts of America	4.3	1.2	3.7		
Oceania	1.6	2.4	11.3		
Asia	9.3	5.9	8.7		
Health restriction				0.101	
Sight	6.3	2.7	5.7		
Walking	2.7	8.1	3.7		
Hearing	1.8	4.1	2.2		
No	87.4	83.8	86.7		
restriction					
More than one	1.8	1.4	1.7		
restriction					
Use of PT at home					0.006
Almost every day	36.4	15.3	32.4		
Once or twice per week	24.6	37.6	27.0		
Rarely or never	39.0	47.1	40.7		
Driving license ownership				0.048	
Yes	92.5	85.7	91.0		
No	7.5	14.3	9.0		
Car ownership				0.705	
Yes	77.2	75.3	76.7		
No	22.8	24.7	23.3		

Table 2
Respondents' trip profiles: PT users vs. non-users.

Variable	User (%) (n=380)	Non-user (%) (n=86)	Total (%) (n=466)	Sig. level (χ^2 test)	Sig. level (U test)
First time visitor in Munich				0.028	
Yes	48.4	35.3	45.9		
No	51.6	64.7	54.1		
Previous visits to Munich					0.007
One time	11.1	9.0	10.7		
2–4 times	17.5	16.7	17.6		
5–10 times	14.5	23.1	16.0		
11–20 times	3.9	9.0	4.8		
More than 20 times	1.9	3.8	2.3		
Trip duration					0.000
One day	9.7	36.2	14.6		
2–3 days	40.7	48.8	42.4		
4–6 days	31.9	11.2	28.0		
7–14 days	13.7	3.8	11.8		
More than 14 days	4.0	3.8	3.2	0.000	
Travel partner					
Alone	15.3	20.0	16.3		
Friends	31.1	21.2	29.2		
Partner	22.7	25.9	23.2		
Family or relatives	21.9	9.4	19.6		
Colleagues	8.7	14.1	9.7		
Other	0.3	9.4	1.9		
Main purpose of the trip				0.062	
VFR	22.0	27.4	23.1		
Business	10.3	17.9	11.7		
Holiday	53.7	36.9	50.5		
Education	9.3	10.7	9.5		
Other	4.8	7.1	5.2		

7. Reasons for PT use/non-use

7.1. Reasons for PT use

Respondents were filtered by the question “Have you used PT in Munich during this visit?” User and non-users were then asked to indicate their reasons by rating the relevance of the motivational statements separately listed for each group. A five-point Likert scale was used with one as the lowest and five as the highest score. Table 3 illustrates a comparison of the motivational statements for both use and non-use by means, median, and mode (in descending order by means).

As illustrated in Table 3 the top two reasons for using PT are related to the advantages of PT in Munich: (1) Public transport in Munich is very accessible and (2) Public transport in Munich is convenient, followed by car-related reasons: (1) I do not want to rent car, and (2) I do not have a car in Munich.

In the second highest mean group are the advantages of being able to do something else while travelling on PT ((1) I want to enjoy the surroundings on the way and (2) I can have more time to do something else on board). Other reasons include cost, traffic jams and the difficulty to find parking spaces in the city centre.

The third group consists of a variety of reasons, which are from slightly relevant to somewhat relevant to the respondents ($2.50 \leq M \leq 3.00$). The last group includes the least relevant reasons ($1 \leq M \leq 2.49$), which are mostly passive reasons, such as: was taken by a local or given a free or discount ticket.

The 20 statements were subjected to factor analysis. Items with loadings lower than 0.5 was removed (“I want to contribute to less

- Travel partners ($p=0.000$): More people travelled with colleagues in the non-user group (14%) as compared to the user group (9%). Tourists coming with colleagues could be people on company excursions or students on study trip, who travelled by coach hence PT was probably not needed.
- Main trip purpose ($p=0.062$): Holiday appears to be the main trip purpose for the user group (54%), however, for the non-user group, this purpose was applied for only 37%. On the other hand, travel for business purposes is more common in the non-user group (18% compared to 10%).

Table 3
Visitors' reasons for PT use/non-use.

No.		Mean	Median	Mode	SD
Reasons for using PT					
1	Public transport in Munich is very accessible	3.83	4	4	1.144
2	Public transport in Munich is convenient	3.81	4	5	1.234
3	I do not want to rent a car	3.75	5	5	1.648
4	I do not have a car in Munich	3.60	5	5	1.673
5	I think travelling by public transport is a better way to explore Munich	3.59	4	4	1.238
6	I want to enjoy the surroundings on the way	3.36	4	4	1.351
7	Travelling on public transport is cheap	3.17	3	3	1.290
8	I want to avoid traffic jam	3.13	3	5	1.437
9	I can have more time to do something else on board	3.06	3	3	1.354
10	It is difficult to find parking lots in the city centre	3.06	3	5	1.573
11	I want to contribute to less pollution	3.04	3	3	1.315
12	I want to contribute to less traffic congestion	2.99	3	3	1.400
13	Travelling by car is expensive	2.97	3	3	1.326
14	I want to get in touch with the local people	2.69	3	3	1.139
15	I do not want to drive in unfamiliar cities	2.52	2	1	1.426
16	I was recommended by someone to use public transport in Munich	2.52	2	1	1.432
17	I want to get to know the country's transport system	2.51	2	1	1.334
18	I was taken around by a local in Munich	2.06	1	1	1.398
19	I can't drive	1.50	1	1	1.144
20	I was given a free or discount ticket	1.48	1	1	1.024
Reasons for not using PT					
1	I did not need to use public transport	3.45	4	5	1.527
2	I prefer walking or cycling	3.33	3	5	1.535
3	I travel by a car	3.14	3	5	1.851
4	I do not want to be dependent on public transport schedules	2.54	2	2	1.587
5	I travel in a tour group	2.18	1	1	1.714
6	Fares are expensive	2.14	2	1	1.424
7	I do not feel comfortable with the crowd	2.10	2	1	1.311
8	I do not have any information about public transport in Munich	1.87	1	1	1.212
9	There is no good connection to where I want to go	1.81	1	1	1.246
10	Public transport is too slow	1.73	1	1	1.125
11	I have mobility restrictions	1.69	1	1	1.249
12	I do not know how to use public transport in Munich	1.68	1	1	1.207
13	Train stations and bus stops are not conveniently located	1.63	1	1	1.161
14	I think it is not safe to travel on public transport	1.50	1	1	1.071
15	I travel with children so I think public transport is difficult to use	1.25	1	1	0.760

pollution" and "I do not want to drive in unfamiliar cities"). Factor analysis was run again with seven factors being generated, which explain 71.6% of the total variance. However, due to low reliability ($\alpha < 0.5$), three factors were considered invalid (cost, inability to drive, and recommendation) and therefore removed. The remaining four factors collectively explain 47.24% of the total variance (Table 4).

Factor 1 ($\alpha=0.75$) explains 13.9% of the variance. It describes the benefits of a drive-free experience in which visitors can do other things on board as opposed to concentrating on driving the car and therefore is labelled "*Drive-free benefit*". The second factor ($\alpha=0.74$) is traffic related (avoid traffic jam, contribute to less traffic and avoid finding parking lots). It explains 12.8% the variance and was named "*traffic reduction*". The third factor ($\alpha=0.66$) describes the "*advantages of the local PT*" and explains 10.5% of the variance. Finally, the fourth factor ($\alpha=0.83$) was labelled "*car unavailability*" as it refers to the lack of car as a reason for using PT as an alternative.

7.2. Reasons for not using PT

Similar to the analysis of the reasons for using PT in Munich, the motivational statements for not using PT were listed in descending order of means (Table 3). The most important group of reasons with means from 3.14 to 3.45 (mode=5) showed that respondents did not use PT because they did not need to or because of the availability of alternative modes (car, walking or cycling). Least important reasons include: (1) I think it is not safe

to travel on PT and (2) I travel with children so I think PT is difficult to use.

The 15 statements were factor analysed and items with loadings below 0.5 were removed (I think it is not safe to travel on PT). Five factors were generated, explaining 76.7% of the total variation of the data. Only four factors were retained (62.9%) and the fifth factor (Group Commitment) was rejected due to a low reliability coefficient ($\alpha < 0.5$).

The first factor ($\alpha=0.84$) describes the reasons that are related to the disadvantages of the PT and personal mobility restrictions of the respondents (train stations and bus stops are not conveniently located, no good connection, mobility restrictions, and travel with children). The factor explains 20.6% of the variance and was named "*inconvenience and restrictions*". "*Lack of information*" is the second factor for not using PT in Munich. This factor has an $\alpha=0.74$ and explains 16.2% the variance. The third factor ($\alpha=0.80$) includes the items related to the "*disadvantages of PT*" (crowded, fixed schedule, fares). It explains 14.8% the variance. The last factor ($\alpha=0.57$) describes the "*personal preferences*" and explains 11.3% the total variance.

7.3. Factors influencing PT use

In order to identify the most important factors that determine a user or non-user of PT, a Discriminant Function Analysis (Stepwise method) was performed with user/non-user of PT as a grouping variable and demographic and trip characteristics as independent variables.

Table 4

Factor analysis of visitor motivations for use/non-use of PT in Munich.

	Motivational statements	Factor loadings	Eigen-value	Variance	Cumulative variance	Reliability coefficient
Use of PT	Factor 1: Drive-free benefit		2.49	13.87	13.87	0.75
	I want to get in touch with the local people	0.816				
	I want to get to know the country's transport system	0.760				
	I want to enjoy the surroundings on the way	0.737				
	I can have more time to do something else on board	0.595				
	Factor 2: Traffic reduction		2.31	12.82	26.69	0.74
	I want to avoid traffic jam	0.845				
	I want to contribute to less traffic congestion	0.833				
	It is difficult to find parking lots in the city centre	0.663				
	Factor 3: Advantages of local PT		1.90	10.51	37.20	0.66
	Public transport in Munich is convenient	0.734				
	I think travelling by public transport is a better way to explore Munich	0.563				
	Public transport in Munich is very accessible	0.556				
Non-use of PT	Factor 4: Car unavailability		1.81	10.04	47.24	0.83
	I do not have a car in Munich	0.936				
	I do not want to rent a car	0.913				
	Factor 1: Inconvenience and restrictions		2.88	20.60	20.60	0.84
	Train stations and bus stops are not conveniently located	0.827				
	There is no good connection to where I want to go	0.821				
	I have mobility restrictions	0.745				
	I travel with children so I think public transport is difficult to use	0.679				
	Factor 2: Lack of information		2.27	16.21	36.80	0.74
	I do not know how to use public transport in Munich	0.889				
	I do not have any information about public transport in Munich	0.783				
	Public transport is too slow	0.642				
	Factor 3: Disadvantages of PT		2.08	14.84	51.65	0.80
	I do not feel comfortable with the crowd	0.875				
	I do not want to be dependent on public transport schedules	0.764				
	Fares are expensive	0.506				
	Factor 4: Personal preferences		1.58	11.25	62.90	0.57
	I did not need to use public transport	0.853				
	I prefer walking or cycling	0.825				

The five most important predictors were identified with 72.2% cases originally correctly classified as follows: (1) length of stay, (2) main purpose of the trip, (3) age group, (4) frequency of PT use at place of residence, and (5) valid driving license ownership (Table 5).

A closer look at the data reveals some differences between user and non-user of PT with respect to the variables identified above. Non-user of PT tended to have shorter stay in Munich ($M=2.45$) compared to the users ($M=4.49$). The majority of non-users stayed in Munich for a period of 1–3 days, whereas most users stayed for 2–6 days. Holiday was the main travelling purpose for most PT users (54%) yet this only applies for 37% of the non-user group. By contrast, more non-users travelled for business (18%) and VFR purposes (27%) compared to their counterpart (10% and 22% respectively). Interestingly, more PT users had a valid driving license than non-PT users (93% compared to 86%). This is probably related to the age group, for which there were much more younger people (age group 18–29) in the user group compared to the non-user (40% and 17% respectively). On the other hand, the proportion of older people (65 years old and above) is higher in the non-user group (13% compared to 6%). It should be noted however that the seniors account only for a minority in the sample (23 PT users and 11 PT non-users). Moreover, more PT users use PT frequently in their local area as compared to non-user (36% compared to 15%).

8. Discussion and conclusions

8.1. The visitor user of PT

The profile of the visitor users of PT characterised in this study echoes findings from previous studies in that they tend to be of

younger age (Barr & Prillwitz, 2012; Dallen, 2007a; Farag & Lyons, 2012; Quiroga, 1990; Thompson & Schofield, 2007), well-educated and most have a valid driving license (Farag & Lyons, 2012). In addition, visitor users of PT in Munich tended to stay for at least two days in the city.

Visitors are often driven by a variety of forces to use PT. In this study, four reasons were identified, which are (1) drive-free benefits, (2) traffic reduction, (3) advantages of local PT, and (4) car unavailability. These reasons confirm and also compliment findings from earlier studies. Lumsdon (2006) emphasised the importance of having social contact and enjoying the view for visitors to use the buses. Dallen (2007a) and Stradling et al. (2007) stated that visitors looked for relaxation when they used the train or bus. In this study, *drive-free benefit* was found to be a significant attraction motivating visitors to use PT. Dallen (2007a) believed that avoidance of road congestion is a strong influence for using the train. Respondents in this study also stated *traffic reduction* as a motivation for their PT use (to avoid traffic jam and to contribute to less traffic congestion). Having no access to car (*car unavailability*) is another reason which makes tourist a captive rider of PT. However, while environmental concern was an important motivation for PT use in some studies (Dallen, 2007a; Guiver et al., 2007; Lumsdon et al., 2006; Stradling et al., 2007), “I want to contribute to less pollution” was not identified as a significant factor ($M=3.0$, ranked 11/20 variables) for respondents in the present research.

Similar to what was found in previous research, visitors in this study were drawn to PT mostly by the “push factors”. Moreover, this study recognises a new factor motivating visitors to use PT, which is “*advantages of local PT*”. Munich is recognised for having one of the most developed and efficient PT systems in Europe. The accessible and convenient system therefore appears to be a pull factor encouraging visitors to use PT in Munich. In another word, if

Table 5
Stepwise regression results (dependent variable: user of PT).^{a,b,c,d}

Step	Entered	Wilks' Lambda							
		Statistic	df1	df2	df3	Exact F			
						Statistic	df1	df2	Sig.
1	Length of stay	0.910	1	1	360.000	35.510	1	360.000	0.000
2	Valid driving license ownership	0.886	2	1	360.000	23.145	2	359.000	0.000
3	Main purpose of the trip	0.866	3	1	360.000	18.538	3	358.000	0.000
4	Age group	0.844	4	1	360.000	16.501	4	357.000	0.000
5	Frequency of public transport use at home	0.835	5	1	360.000	14.094	5	356.000	0.000

At each step, the variable that minimises the overall Wilks' Lambda is entered.

^a Maximum number of steps is 28.

^b Minimum partial F to enter is 3.84.

^c Maximum partial F to remove is 2.71.

^d F level, tolerance, or VIN insufficient for further computation.

the PT system is good enough, visitors would use it. This, however, needs to be confirmed by further research on how willing visitors are to use PT.

8.2. The visitor non-user of PT

This study is the first to examine visitor non-users of PT in an urban area, thus there are no other similar profiles to compare with. However, visitor PT non-users in this study share some demographic similarities with Dallen's (2007a) non-train user (visitors to a coastal resorts) and Barr and Prillwitz's (2012) reluctant PT users (resident PT users) as they tended to be of an older age than the user group (medium to older age groups). Visitor non-users of PT are also likely to be returning visitors on a one day excursion to Munich. In contrast to the motivations for PT use, most reasons for non-use refer to pull factors: (1) inconvenience and restrictions, (2) lack of information, (3) disadvantages of PT in addition to a push factor: (4) personal preferences.

Comfort is an important consideration when travelling (Felleson & Friman, 2008); therefore PT would not be used if it is or perceived to be *inconvenient* and has *restricted access*. Accessibility to bus stops and train stations is important to increase PT ridership (Brons et al., 2009). The more accessible PT is, the more people would use it. Inconveniently located train stations and bus stops would discourage people from using PT. As also suggested by Stradling et al. (2007) and Dallen (2007a), problems with service provision and mobility restrictions prevent customers from using PT. Furthermore, cost (Stradling et al., 2007) and inflexibility are in some cases *disadvantages of PT* in attracting passengers.

One important reason leading to non-use of PT is the *lack of information*. Dallen (2007a) believed that tourists did not use the train because they were not aware that there was a train to the destination. Information is recognised as very important for visitors when using public transport (Friman et al., 2001; Friman & Gärling, 2001). According to Thompson (2004), tourists require more information than residents. Krizek and El-Geneidy (2007) additionally suggested that irregular PT users are more sensitive to information. It is thus important that visitors are well informed about PT in the city so that PT could be a mode of consideration.

Apart from these objective reasons, *personal preferences* played an important role in visitors' decision of transport mode use. As also indicated by Dallen (2007a) and Stradling et al. (2007), visitors may simply prefer driving to PT. In this case, encouraging a modal shift is challenging. However, if they prefer walking or cycling than PT the lack of modal shift is not a great concern given that encouragement of such activities is within the city's urban development and mobility goals.

8.3. Factors affecting visitor demand for PT

Factors influencing mode choice have been extensively studied in transport research. Several factors were identified including service frequency, access and egress, time and cost (Krizek & El-Geneidy, 2007). Stradling et al. (2007) found that age and frequency of bus use are most influential on motivational factors of PT use. This study confirms the importance of age in determining a PT user. The visitor PT users tended to be younger people, whereas non-users are mostly of medium to older ages. Trip duration and trip purposes also provide some implications for marketing strategies. Users of PT are likely to be on holiday and stay longer in Munich than the non-users. While it is difficult to get information on visitors' ownership of driving license and their frequency of PT use at home, this information is useful for PT operators to understand the visitor transport behaviour and habits.

9. Conclusions

Transport is an essential element in the tourism systems and PT plays a vital role in sustainable tourism development. However, little research has previously been undertaken on the visitor users of PT at destination (Lumsdon et al., 2006). Even less known are their motivations for PT use and non-use. This paper's objectives were to understand how visitors use PT at a particular destination and which factors determine a user vs. a non-user. The main reasons for visitor use of PT are drive-free benefits, traffic reduction, advantages of local PT, and car unavailability. In contrast, what often discourages PT use are inconvenience and restrictions, lack of information, disadvantages of PT and personal preferences. The five most important variables that differentiate a visitor user of PT from a non-user are length of stay, main purpose of the trip, age group, frequency of public transport use at place of residence and valid driving license ownership.

Potential riders can be attracted by service improvement. The findings of this study suggested that the target customers for PT in an urban area are younger tourists on their first visit to the city. These tourists often travel on holiday and stay in the city for more than one day. To encourage more use, it is important to provide information on PT to the visitors. Accessible and conveniently located train stations and bus stops are also crucial to motivate PT use. A potentially important finding is the extent to which the advantages of the city's PT were recognised by visitors before arrival. This has significant implications for promotion of public transport as part of the overall strategic marketing package of a

destination if there is a desire to encourage PT use and assuring tourists that they can “leave their car behind”. The use of social marketing techniques to influence behavioural change with respect to PT use would therefore appear desirable in the pre-trip decision stage (Hall, 2014; Truong & Hall, 2013) rather than just at the destination, as by then significant numbers of visitors will have already committed to car use.

Though carefully planned and conducted, this study is not without limitations. First, most study sites are centrally located and relatively easy to access by PT. More respondents in remote tourist attractions would have provided a better picture of tourist perceptions. Second, the use of highly scheduled coach tours by older visitors meant that in some circumstances they did not have time to respond to the survey. This may therefore have affected the relative response rate of older travellers. Third, as with all self-completed surveys, some respondents might not have answered the questionnaire carefully or understood the questions correctly. More open-ended questions may have also provided useful further information in tourist behaviour.

Despite these limitations, the paper has shed light on the use of PT by visitors at the destination. This study identified the distinctions between the visitor users and non-users of PT, which would provide basis for further studies on tourist use of PT at destinations. Further studies are necessary to better understand tourist behaviour and improving their experience with PT, especially as such research may not only bring economic returns to the destination but also contribute to sustainable transport goals. Aspects such as factors affecting visitor willingness to use PT and the role of an excellent PT in motivating modal shift could be interesting topics for future research in urban tourism.

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